Research Article

EFFICACY OF BRONCHIAL WASH CYTOLOGY AND ITS CORRELATION WITH BIOPSY IN LUNG TUMOURS AT MEDICAL COLLEGE HOSPITAL BIKANER

Sharda Dawan[1]., Sunita Bika[2] and Manohar Lal Dawan[3]

Sardar Patel Medical College, Bikaner, Rajasthan

A B S T R A C T

Background- Lung cancer is one of the most frequent malignancies in the industrialized nations. It is the commonest cause of death from cancer in males.

Material& Method- This study was carried out in department of pathology, Sardar Patel Medical College & Associated Group of Hospitals, Bikaner. This study included 50 cases of clinically suspected lung cancer either primary or metastatic.

Results- diagnostic accuracy of Bronchial Brush Cytology in comparison with Histopathology. The accuracy of Bronchial Brush Cytology in the diagnosis of Squamous Cell Carcinoma was 81.57%; in Bronchogenic Adenocarcinoma accuracy was 80%, in Small Cell Anaplastic Carcinoma 83.33% and in Large Cell Carcinoma it was 100%.

Conclusion: It is concluded that bronchial wash cytology is a valuable tool and yields almost same information as biopsy. It is useful in patients with evidence of obstruction or risk of haemorrhage.

INTRODUCTION

The era of modern diagnostic cytopathology began with the publication in 1941 and 1943 by Dr. G. Papanicolau and H. Traut [1]. The use of cytological methods in diagnosis of malignant lesions of the respiratory tract has been generally acclaimed as one of its most successful applications[2].

To combat the disease successfully, it should be diagnosed at earliest possible stage. For early diagnosis different diagnostic modalities are available which include; radiology, bronchoscopy, bronchial biopsy, exfoliative cytology, brushing, washing and fine needle aspiration cytology. It is not possible to perform all techniques in each patient because each has specific advantages and disadvantages. However their combined use yields the best results[3,4]. Before any aggressive treatment, a clear distinction between small cell carcinoma and non-small cell carcinoma should be made by obtaining a tissue diagnosis. For that histopathological examination remains, the mainstay of the diagnosis.

Bronchial biopsies cannot be performed in more peripheral sites or in patients at risk of haemorrhage. So alternative methods for obtaining diagnosis are sometimes required. Bronchoscopic washing, brushing and fine needle aspirations may complement tissue biopsies in the diagnosis of lung cancer.[5,6] The bronchial washing is a safer technique and the

malignant cells can be readily recognized and typed.[7,8] There is still disagreement as to the value and reliability of wash and brush cytology in comparison with histology for the diagnosis of malignancy.

MATERIAL AND METHODS

This study was carried out in department of pathology, Sardar Patel Medical College & Associated Group of Hospitals, Bikaner. This study included 50 cases of clinically suspected lung cancer either primary or metastatic.

The samples were obtained by fiber-optic bronchoscopy by the chest physician at department of Chest & Tuberculosis, S.P. Medical College and P.B.M. hospital, Bikaner.Bronchial brushings were received as air-dried and wet-fixed smears of two to three brushings by disposable bronchial brush, smeared directly on to the clean glass slides. The bronchial brushing tends to preserve both the cells and their architectural arrangement. The air dried smears were stained with Giemsa and the wet fixed slides with Haematoxylin & Eosin stains.

Bronchial brushing cyto-preparation method: material required [10]

- Four albuminized slides numbered.
- Four conical centrifuged tubes and wooden applicators.
- Jar with fixative-95% ethanol.

Thick mucoid or bloody secretions are smeared directly on the slides. Thinner aspirations and washings were processed as follows- transfer specimen to 15 ml capacity conical tubes.

Corresponding author: **Sharda Dawan**
Sardar Patel Medical College, Bikaner, Rajasthan

Centrifuge 10 minutes at 2500 r.p.m., pour off supernatant, with a wooden applicator apply a small portion of sediment to one of the identified slides, and with a second slide by spreading the material smears were prepared. Drop slides into 95% ethanol.

Bronchial biopsies received in 10% formalin and after processing tissue were embedded in paraffin wax to make blocks. After making sections in microtome, staining were carried out with haematoxylin & eosin and findings were observed in light microscope.

RESULT

The table: II showing distribution of cases gender wise with Histo-pathological diagnosis. In this study out of 88% of male cases, 72% were diagnosed squamous cell carcinoma, 8% Bronchogenic carcinoma, 6% small cell anaplastic carcinoma and 2% were of large cell Adenocarcinoma. Among 12% of female cases, squamous cell carcinoma was diagnosed in 4% cases, Bronchogenic carcinoma in 2% cases; small cell anaplastic carcinoma in 6% cases and none of the female was diagnosed large cell Adenocarcinoma. Male to female ratio is 7:1.

The Table: III showing comparison between Histo-Pathogical and Cytological findings of specimen received from Chest

Table I Age-Wise Distribution of Cases Based on Histo-Pathological Diagnoses

S.N.	Age group (Year)	Sq. Cell Ca. n (%)	Bronchogenic Adenocarcinoma n (%)	Small Cell Anaplastic Ca. n (%)	Large Cell Ca. n (%)	Total. n (%)
1.	0-10	Nil	Nil	Nil	Nil	Nil
2.	11-20	Nil	Nil	Nil	Nil	Nil
3.	21-30	Nil	Nil	01 (02)	Nil	01(02)
4.	31-40	04 (08)	Nil	Nil	Nil	04 (08)
5.	41-50	08 (16)	02 (04)	01 (02)	Nil	11 (22)
6.	51-60	12 (24)	02 (04)	01 (02)	Nil	15 (30)
7.	61-70	11 (22)	01 (02)	03 (06)	01 (02)	16 (32)
8.	71-80	03 (06)	Nil	Nil	Nil	03 (06)
9.	>80	Nil	Nil	Nil	Nil	Nil
Total	All Ages	38 (76)	05 (10)	06 (12)	01 (02)	50 (100)

The Table I showing Age wise distribution of cases based on Histo-pathological Diagnosis. Age range is 30 to 75 year. According to our study (table I) the Squamous cell carcinoma (76%) is most common lung malignancy in all age group and next to this is Small cell anaplastic carcinoma (12%), Bronchogenic Adenocarcinoma (10%) and large cell carcinoma is least common (02%) of all. In this study Squamous cell carcinoma is more common (24%) in middle age group (51-60 year) and less common (6-8 %) in extreme of ages (<40 and >70 year). Bronchogenic Adenocarcinoma is more common in 40-60 year age group as 8 % of cases and none of the cases diagnosed in below 40 and above 70 year. The small cell anaplastic cell carcinoma is most commonly (06%) diagnosed in 61 to 70 year age group and 4% cases in 41-60 year age and one case also diagnosed in 21-30 year age group and none of the cases diagnosed in >70 year group. The Large cell carcinoma is diagnosed only in one case of 61-70 year age group.

Physician after fiber-optic bronchoscopy done in 50 patients of clinically suspected lung cancer. In our study Squamous Cell Carcinoma (S.C.C.) is found to be most common lung cancer, as 76% (38) cases diagnosed out of 50 clinically suspected lung malignancies. Bronchial Wash (BW) cytology was helpful in making diagnosis in 23.68% (09) cases. In our study Bronchogenic Adenocarcinoma was diagnosed in 10% (5) of total cases under gone fiber-optic bronchoscopy for clinical suspicion of lung malignancy. The final diagnosis of Adenocarcinoma was made by Histo-pathological method in 5 cases. The cytological methods, Bronchial Wash (BW) was positive in 60% (3) biopsy proved cases of Bronchogenic Adenocarcinoma.In our study Small Cell Anaplastic Carcinoma (SCAC) was diagnosed by Histo-pathological study in 12% (6) cases under gone Fiber-optic Bronchoscopy for clinical suspicion of lung malignancy. The cytological methods, Bronchial Wash (BW) was positive in 33.33% (2) of biopsy proved cases of Small Cell Anaplastic Carcinoma.

Table II Distribution of Cases Based on Histo-Pathological Diagnosis in Male & Female

S.N.	Gender	Sq. Cell Ca. n (%)	Bronchogenic Adenocarcinoma n (%)	SCAC n (%)	Large Cell Adenocarcinoma n (%)	Total No. Of Cases n (%)
1.	Male	36 (72)	04 (8)	03 (6)	01 (2)	44 (88)
2.	Female	02 (04)	01 (02)	03 (06)	Nil	06 (12)
Total		38 (76)	05 (10)	06 (12)	01 (02)	50 (100)

Table III The Comparative study between Fiber-optic Bronchoscopy guided Biopsy and Cytology of clinically suspected Lung Malignancy.

S.N.	Diagnosis	HPR n (%)	BW n (%)
1.	Sq. Cell Ca.	38 (76)	09 (24)
2.	Bronchogenic Adenocarcinoma	05 (10)	03 (60)
3.	Small Cell Anaplastic Ca.	06 (12)	02 (34)
4.	Large Cell Ca.	01 (2)	01 (100)

In our study Large Cell Carcinoma was diagnosed by Fiber-optic bronchoscopic guided biopsy in 2% (1) cases of clinically suspected lung malignancy.

Table IV Accuracy of Bronchial Brush Cytology in Comparison with Histo-pathological diagnosis

S.N.	Diagnosis	HPR (n)	B.B. (n)	% Accuracy
1.	Sq. Cell Ca.	38	31	82
2.	Bronchogenic Adenocarcinoma	05	04	80
3.	Small Cell Anaplastic Ca.	06	05	83
4.	Large Cell Ca.	01	01	100

The Fiber-optic Bronchoscopy guided Cytological methods, Bronchial Wash (BW) was positive in 100% (1) biopsy proved case of Large Cell Carcinoma.

The table: IV showing diagnostic accuracy of Bronchial Brush Cytology in comparison with Histo-pathology. The accuracy of Bronchial Brush Cytology in the diagnosis of Squamous Cell Carcinoma was 81.57%; in Bronchogenic Adenocarcinoma accuracy was 80%, in Small Cell Anaplastic Carcinoma 83.33% and in Large Cell Carcinoma it was 100%.

DISCUSSION

Lung tumours are the most common cause of death due to cancer in men and are now emerging as important cause of neoplastic mortality in females[11]. The male to female ratio in this study is18:1 which is closer to a local study.[12] Majority of these cases were found in their 5th and 6th decades. This could be due to higher prevalence of smoking in males in our society.

Pulmonary cytology and histopathology are valuable tools in the diagnosis of lung malignancies. The first realization that cancer of the lung could be accurately diagnosed and typed by the microscopic study of expectorated cells is generally attributed to Dudgeon and Barret[13]

Fibreoptic bronchoscopy was introduced in 1968 as a diagnostic procedure. Since then apart from sputum, different methods for obtaining satisfactory specimens have become available. Examination of sputum can provide evidence of malignancy in case of cancer. The specimens collected by fiberoptic bronchoscope yield a higher positive rate. The sensitivity of bronchial aspirates in diagnosing lung cancers has been 75 to 88.1 % at various centres.[14]Due to difficulties in obtaining representative material from the bronchial tree, the examination of bronchial secretion has been discontinued. Now bronchial brushings are favoured for the cytological investigation of proximal lung cancers.

From management point of view, lung tumours are generally separated into small cell carcinomas and non-small cell carcinomas. For small cell carcinomas intensive chemotherapy is advised whereas the non-small cell carcinomas are better treated surgically. More than 80% cases have been correctly typed by Truong and co-workers with sputum, washing or brushing cytology.[15]

The overall accuracy of bronchial washing was 75% and 75.4% by two other studies by Truong *et al* 15 and Chaudhary *et al*16 respectively, whereas in present study it was slightly higher.

CONCLUSION

It is concluded that bronchial wash cytology is a valuable tool and yields almost same information as biopsy. It is useful in patients with evidence of obstruction or risk of haemorrhage.

Bibliography

1. Svante R Orell, G F Sterrett, D. Whitaker. Fine Needle Aspiration Cytology: 4th Ed., Churchil Livingstone; 2005.p.
2. Johnston WW, Elson CE. Respiratory Tract, In: Bibbon M, Editor, Comprehensive Cytopathology, 2nd Ed., Philedelphia: WB Saunders Company; 1997. P.325-401.
3. Ahmed M, Khan AH, Mansoor A. The pattern of malignant tumours in Northern Pakistan. *J Pak Med Assoc* 1991; 41: 270-3.
4. Jaffarey NA, Zaidi SHM. Cancer in Pakistan. *J Pak Med Assoc* 1987; 37:178-83.
5. Aziz F, Ihsan H. Diagnostic evaluation of bronchial washing, brushing and biopsy in bronchogenic carenloma: a prospective study of 97 cases. *Ann King Edward Med Cell* 1998; 4: 5-6.
6. Karahalli E, Yilmaz A, Turker H, *et al*. Usefulness of various diagnostic techniques during fiberoptic bronchoscopy for endoscopically visible lung cancer: should cytologic examination be performed routinely? *Respiration* 2001; 68:564-5.
7. Chaudhry MK, Rasul S, Iqbal ZH, *et al*. Fiberoptic bronchoscopy - role in the diagnosis of bronchogenic carcinoma. *Biomedica* 1998; 14:32-6.
8. Young JA.Techniques in pulmonary cytopathology. ACP Broadsheet 140. J Clin Pathol 1993; 46:589-95..
9. Jones AM, Hanson IM, Armstrong GR, *et al*. Value and accuracy of cytology in addition to histology in the diagnosis of lung cancer at flexible bronchoscopy. *Respir Med* 2001; 95: 374-8.
10. The haematoxylin: in theory and practice of histological techniques by John D Bancroft and Alan Stevens. 3rd Ed., Chapter 7, Pg. 109-112, 1992.
11. Shopland DR, Eyre HJ, Pechacek TF. Smoking - attributable cancer mortality in 1991: is lung cancer now the leading cause of death among smokers in the United States? *J Natl Cancer Inst* 1991; 83:1142-8.
12. Tanwani AK, Haque A. Co-relation of bronchial brushing with biopsy in lung lesions. *Pak J Med Res* 2000; 39:115-20.
13. Dudgeon LS, Barrett NR. The examination of fresh tissues by the wet-film method. *Br J Surg* 1934; 22:4-22.
14. Piaton E, Grillet-Ravigneaux MH, Saugier B, *et al*. Prospective study of combined use of bronchial aspirates and biopsy specimens in diagnosis and typing of centrally located lung tumours. *BMJ* 1985; 310:624-7.
15. Truong LD, Underwood RD, Greenberg SD, *et al*. Diagnosis and typing of lung carcinomas by cytopathologic methods: a review of 108 cases. Acta Cytol 1985; 29:379-84.
16. Chaudhary BA, Yoneda K, Burki NK. Fiberoptic bronchoscopy: comparison of procedures used in the diagnosis of lung cancer. *J Thorac Cardiovasc Surg* 1978; 76: 33-7.